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Clinical contribution

A modified Thermoplastic Retainer

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ABSTRACT

The aim of this article is to describe a method for fabricating a new esthetic maxillary retainer. To fabricate this retainer it is necessary to fit a segment of orthodontic wire in the maxillary molar and premolar region, followed by plasticization of the model. In order to allow occlusal finishing the occlusal and incisal surfaces of the plate are removed. The described retainer can be a useful alternative to the orthodontist for esthetic orthodontic retention.

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1. Introduction

After orthodontic movement and treatment of malocclusion the teeth tend to return to their initial positions¹. This tendency, called relapse, may be eliminated with the use of retainers². Thus the aim of orthodontic retention is to maintain the teeth in ideal static and functional positions³. The length of time during which the retainer must remain in place is related to the patient's age, characteristics and severity of the malocclusion, habits and other etiological factors, mechanics used and the orthodontist's clinical experience^{2–4}.

There are various types of retainers used in the maxillary arch^{2–6}. Usually, these retainers are orthodontic plates with orthodontic wire around the vestibular faces of all the teeth⁷.

Nevertheless, there has been a growing demand for esthetic orthodontics in dental offices, especially among adults. With the aim of meeting this demand, esthetic brackets appeared, with the great advantage of being transparent^{2,3}.

After having undergone treatment with esthetic brackets, patients refuse to use retainers with visible orthodontic wire.

In an endeavor to overcome this obstacle, thermoplastic retainer plates appeared. These appliances have the advantage of being esthetic and the disadvantage of occlusal interferences⁸. With the intention of eliminating this disadvantage, the aim of the present study is to demonstrate the fabrication of a modified esthetic retainer.

2. Fabrication Technique

Having obtained the plaster cast of the maxillary arch, segments of section 0.8-inch stainless steel orthodontic wire are fitted around the teeth from the lingual face of 17 and 27 to the vestibular face of 15 and 25 (Figure 1). These wire segments are fixed onto the plaster model with fast drying, cyanoacrylate adhesive (Superbond®, São Paulo, Brazil). The dental cast with the fitted wire must be taken to the plasticizer, where

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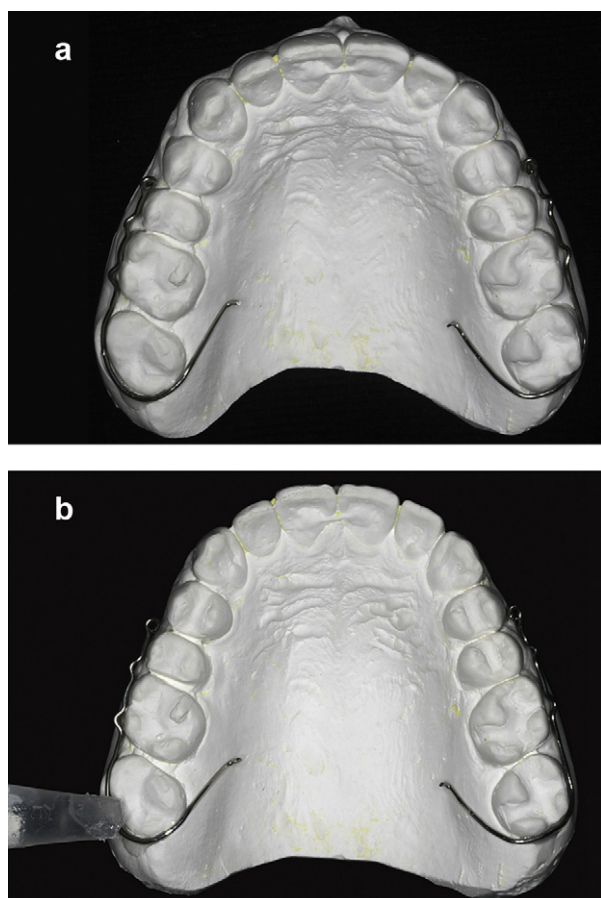


Fig. 1 – a. Occlusal view of the mandibular model with the segment of stainless steel wire around it; and b. Bonding of the wire segments with fast drying adhesive.

it will be plasticized with the use of 2 mm thick acetate plate (Bioart, São Paulo, Brazil) (Figure 2 a).

Next, the outlines of the plate are delimited using a red pen (Figure 2 b-d), to facilitate cutting with a diamond carborundum disk (Figure 3). Self-curing acrylic resin is then applied between the acetate of the plate and the clips in order to fix them, making the plate more rigid (Figure 3 b). Afterwards the plate is finished and polished was 1200 grit wet abrasive paper followed by polishing with pumice stone.

The plate is applied to the patient's mouth where a few adjustments are necessary.

3. Case Report

The patient V.S.F., 28 years of age, came to the dental office with the chief complaint of spaces between the teeth. The malocclusion initially presented was Class I with anterior open bite. The patient showed resistance to using a metal orthodontic appliance, and the use of monocrystalline ceramic brackets with esthetic wires was then suggested. After the malocclusion had been treated the orthodontic appliance was removed, and then the esthetic thermoplastic retainer was put in place (Figure 4).

4. Discussion

Ponitz⁹ was the first to describe an alternative to the traditional removable retainer in 1971: the clear thermoplastic retainer. The material for the device, made of a translucent acrylic sheet, was heated and either vacuum- or pressure-formed over the working cast. This thermoplastic retainer

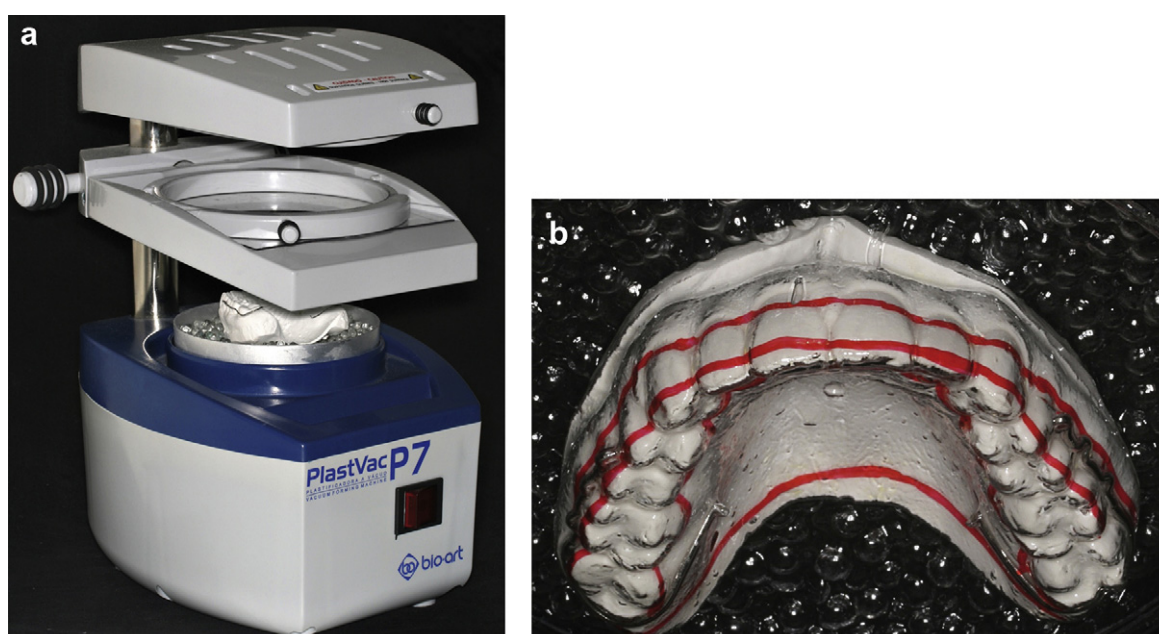


Fig. 2 – a. Model placed in the vacuum plasticizer; and b. Anterior view of the areas to be cut with disc.

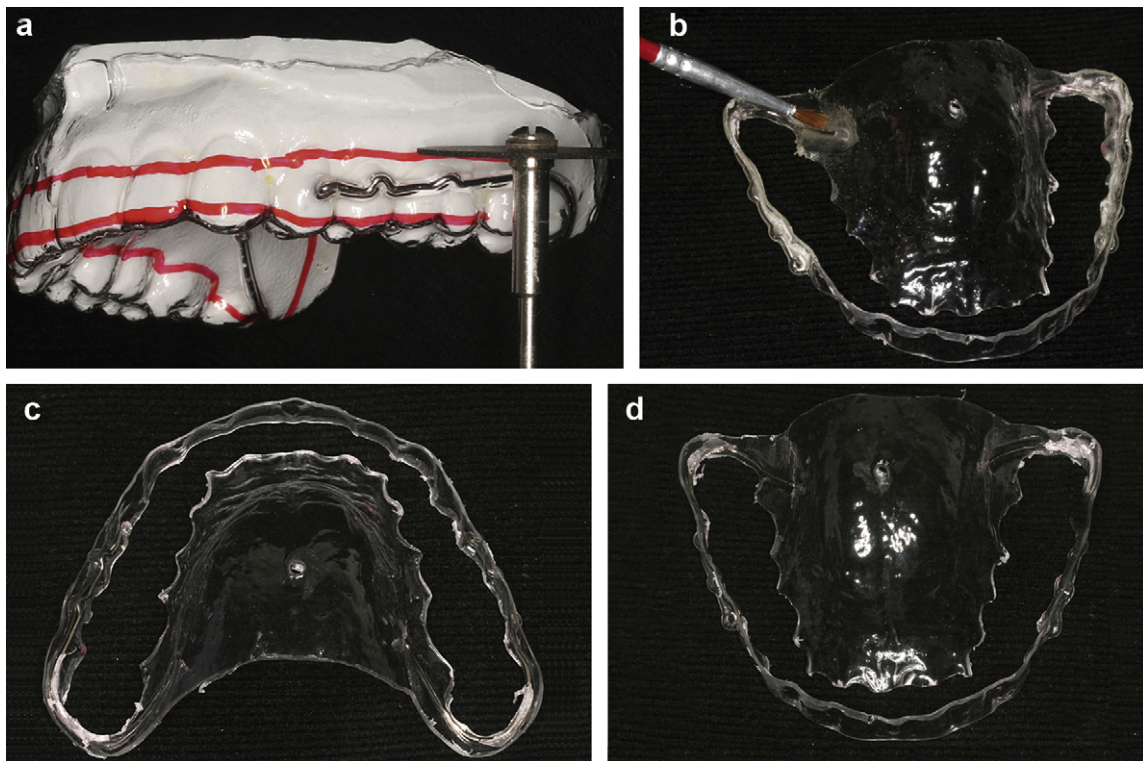


Fig. 3 – a. Cutting with carborundum disc; b. Fixation of stainless steel segments in the acetate with self-polymerizing acrylic; c and d. Finished retainer.

is durable, esthetic, easy to clean, and costs about one third less than the conventional Hawley device. It usually requires no adjustment on delivery¹⁰, and some practitioners find it more readily accepted by patients as an esthetic means of retention¹¹. Clearly, thermoplastic retainers could also produce minor tooth movement⁸ or serve as carriers for bleaching solutions¹².

Another benefit of thermoplastic retainers is the significant reduction in laboratory fabrication time, as few materials are required and the fabrication technique is simple^{10,12}. The aim of the present article was to describe a variation of the plastic retainer for the purpose of enhancing its advantages. One of the negative points with regard to the use of plastic retainer is that this device interferes in occlusion, because when the occlusal surface is plasticized, the occlusal portions of the teeth are also plasticized.

When Dincer and Aslan 2009 evaluated the occlusal contacts after the use of plasticized retainers, they observed that there was no increase in occlusal contact at the end of the retention period¹³. Sauget et al., 1997¹⁴ compared the changes in the number of occlusal contacts when Hawley and clear overlay orthodontic retainers were used. They concluded that the retentive capacities of the two retainers differed: the Hawley retainer allowed relative vertical movement (settling) of the posterior teeth while the clear overlay retainer held teeth in their debanding position.

Theroux⁶ was the first author who proposed a modification in thermoplastic retainer appliances, and in his proposal the appliance was provided with relief in the region of occlusion of premolars and canines.

The positive aspect of the retainer described here is that it does not interfere with occlusion, since the occlusal and incisal surfaces of the teeth remain free and favor vertical movement of the teeth, allowing for a better dental intercuspidation after the fixed appliance is removed. It has the esthetic advantage of plasticized retainers in addition to the efficiency and vertical freedom of the Hawley type retainer. To achieve this, it was necessary to fit orthodontic wires in the posterior region to increase posterior rigidity which was lost with the removal of the acrylic from the occlusal portions of the teeth.

The advantages of this device when compared with conventional maxillary retainers are 1) enhanced esthetic appearance, 2) better contour of the teeth, 3) ease in manufacturing with less laboratory time and at a reduced costs. The disadvantage is that it is impossible to adjust it in cases requiring closure of spaces or small tooth movements.

The presence of palatal covering was not shown to be a negative point of this retainer, since the plate is only 2mm thick. From a biologic point of view, the material from which it is fabricated does not cause cytotoxicity¹⁵.

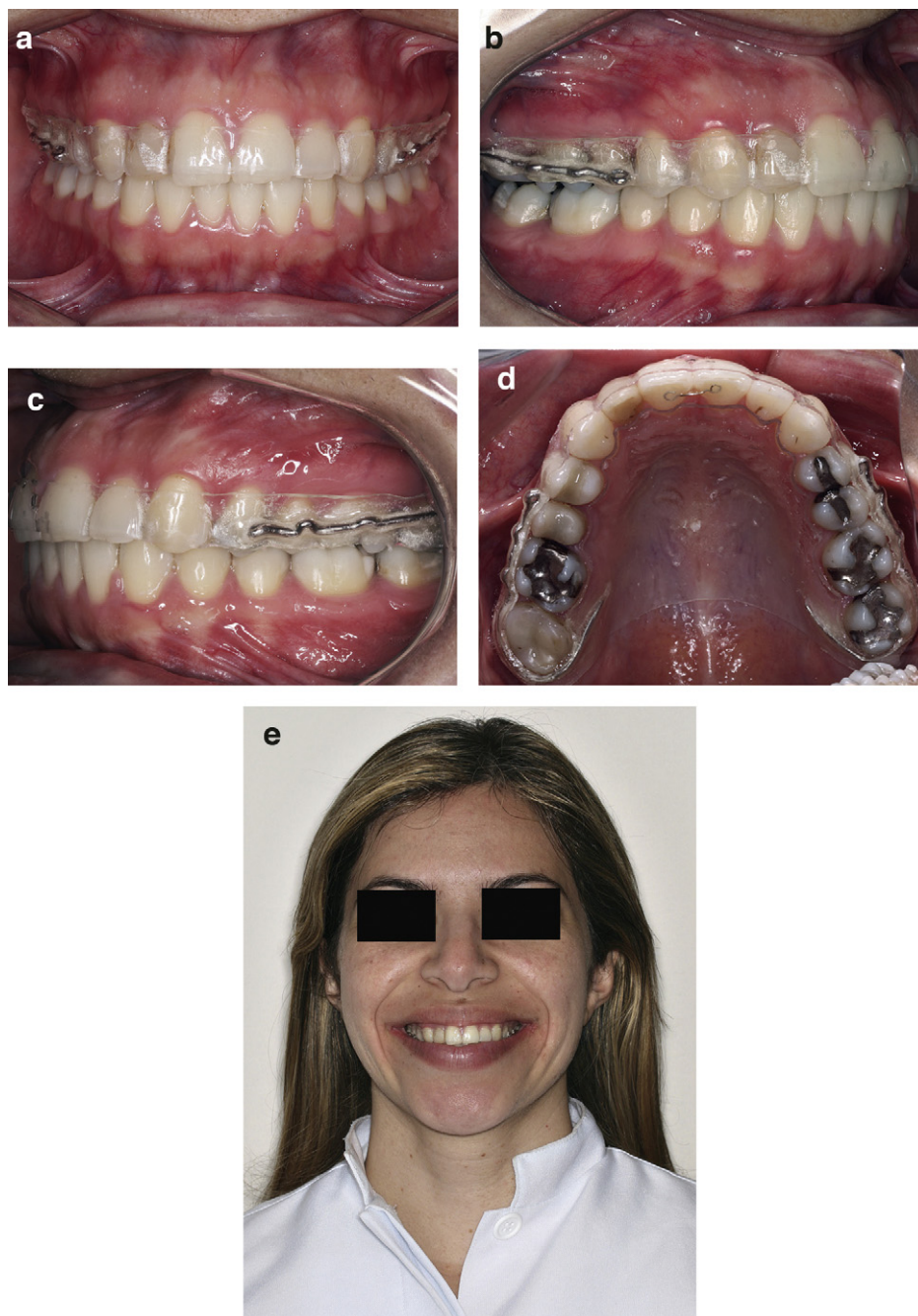


Fig. 4 – a-d. Maxillary intraoral frontal, lateral and occlusal views of the appliance in place; e. Frontal view of smiling patient.

5. Conclusions

The retainer here described can be an esthetic and effective method for orthodontic post-treatment retention.

Conflict of interest

The authors have no conflicts of interest.

Riassunto

L'obiettivo del presente contributo è quello di descrivere un metodo per la costruzione di un nuovo apparecchio estetico per la contenzione

del mascellare superiore. Per costruire questo retainer è necessario inserire un segmento di filo ortodontico nella regione molare e premolare superiore e poi procedere alla plastificazione del modello. Per consentire la finitura occlusale vengono rimosse le superfici incisali e occlusali della placca. L'apparecchio di contenzione descritto può costituire una utile alternativa a disposizione dell'ortodontista per la contenzione ortodontica estetica.

Résumé

L'objectif de cette étude est décrire une méthode pour réaliser un nouvel appareil esthétique de contention du maxillaire supérieur. Pour fabriquer cet appareil il faut insérer un segment de fil orthodontique

dans la région molaire et prémolaire supérieure et ensuite procéder à plastifier le modèle. Pour permettre la finition occlusale, les surfaces occlusales et incisales de la plaque sont enlevées. L'appareil de contention décrit peut représenter une bonne alternative à disposition de l'orthodontiste pour la contention esthétique.

Resumen

El objeto de este estudio es describir un método para la fabricación de un nuevo aparato de retención del maxilar superior. Para fabricar este aparato cabe insertar un segmento de alambre ortodóntico en la región molar y premolar superior y luego plastificar el modelo. Para permitir el acabado oclusal se retiran las superficies oclusales e incisales de la placa. El aparato de retención descrito puede suponer una alternativa valiosa al alcance del ortodoncista para la retención ortodóntica estética.

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